

## **REMARKS**

Claims 1-55 remain pending in the application. Reconsideration is respectfully requested in light of the following remarks.

### **Section 103(a) Rejections:**

The Office Action rejected claims 1-12, 15, 18-23, 25-36, 41-44 and 46-53 under 35 U.S.C. § 103(a) as being unpatentable over Sun et al. (U.S. Patent 6,442,663) (hereinafter "Sun") in view of what would have been obvious to one of ordinary skill in the art at the time the invention was made. Applicants respectfully traverse this rejection for at least the following reasons.

The object of the Sun patent is to develop a solution for efficient heterogeneous process migration (Sun -- col. 2, lines 19-21). At columns 2-7, Sun presents an overview of various prior process migration techniques. Sun describes drawbacks of each prior technique that make the prior techniques inadequate for the purpose sought by Sun. Thus, each of the prior techniques described by Sun at columns 2-7 are specifically not advocated by Sun to achieve Sun's intended purpose. The Examiner's rejection is based on a combination of Sun's own technique one of the non-advocated prior techniques. In particular, the Examiner combines teachings from a non-advocated prior technique at col. 6, lines 10-23, with Sun's buffer data transfer (BDT) mechanism described at col. 8, lines 4-35. The non-advocated prior technique described at col. 6, lines 10-23, is referred to by Sun as "Smith and Hutchinson's work" (col. 5, line 63 – col. 6, line 42). Sun specifically describes drawbacks to Smith and Hutchinson's work. For example, at col. 6, lines 34-42, Sun states in regard to Smith and Hutchinson's work:

The compiler must be modified to provide debugging information and to insert preemption points and call points into the executable code for capturing and restoring process states. The need to modify the front-end and back-end of the compiler may limit portability to various computer platforms, since the compiler must be modified for each architecture in the environment. Also, a modified compiler may not be able to fully exploit the machine-specific optimization of a native compiler.

Thus, Sun specifically teaches away from Smith and Hutchinson's work. References that teach away cannot serve to create a prima facie case of obviousness. *In re Gurley*, 27 F.3d 551, 553, 31 USPQ2d 1131, 1132 (Fed. Cir. 1994). It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 218 USPQ 769, 779 (Fed. Cir. 1983). The rejection is improper since it is based upon a combination of Sun's own technique with teachings from a technique that is taught away from by Sun.

Furthermore, contrary to the Examiner's assertion, the cited art does not teach storing a first state of the process executing within the first device to a persistent store and sending the first state of the process from the persistent store to a second device. A persistent store is different from storing runtime data "in memory." Sun does not teach storing process state to a persistent store and sending the process state as stored in the persistent store. Sun appears to migrate process data from the in-memory execution space of the process. There is no suggestion or reason in the prior art to store the process state to a persistent store.

The Examiner admits on p. 5 of the Office Action that Sun does not teach a persistent store. However, the Examiner takes Official Notice that "using a persistent store in lieu of volatile memory (e.g. RAM) in a computing environment was well known in the art at the time the invention was made." Although the use of a persistent store has certainly been known in particular contexts, one of ordinary skill in the art would not have been motivated to use a persistent store "in lieu of" the run-time memory in Sun. In fact, Sun specifically teaches away from such a modification. At col. 2, lines 43-51, Sun discusses storing process state to a persistent store (e.g. checkpointing to a file). Sun states that this is "too slow" for Sun's purposes. Furthermore, Sun's buffer data transfer (BDT) mechanism relied upon by the Examiner at col. 8, lines 4-35, specifically refers to sending and restoring "live data" as opposed to persisted data. Thus, Sun expressly teaches away from storing a first state of the process executing within the first device to a

persistent store and sending the first state of the process from the persistent store to a second device.

Moreover, contrary to the Examiner's assertion, Sun does not teach expiring one or more leases to services for the process on the first device and establishing the one or more leases to services for the process on the second device. The Examiner refers to the general statement in Sun at col. 2, lines 62-65, that "all data necessary for future execution of the process has to be collected and then restored in the data segment of the new process on another machine." This general statement does not teach that one or more leases are expired for the process on the first device and established for the process on the second device. The Examiner appears to be asserting that leases would be inherent in Sun's reference to "all data necessary for future execution of the process." However, "in relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). Many processes and computing platforms do not even use the concept of lease for services. Therefore, leases cannot be said to be inherent in the data mentioned in Sun. Moreover, even for platforms that use leases, a lease would not necessarily be required for future execution of a process after it was migrated. Furthermore, even if leases were used, the leases would not necessarily have to be expired on the first device and then established on the second device. Even for platforms that use leases, the lease information is typically not considered part of the process state and therefore would not migrated with the process in the prior art. "The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Continental Can*, 948 F.2d at 1268, 20 USPQ2d at 1749.

In regard to claim 2, Sun does not teach stopping the process execution on the second device, selecting a previous state of the process executing within the first device from the persistent store, and reconstituting the selected previous state of the process on the first device. The sections of Sun cited by the Examiner only discuss migrating a

process from one machine to another. They mention nothing about being able to resume the process back on the first machine and reconstitute a selected previous state of the process back on the first machine.

In regard to claims 3-12, 15, 19 and 20, the Examiner rejects each of these claims by referring to the single general statement in Sun at col. 2, lines 62-65, that “all data necessary for future execution of the process has to be collected and then restored in the data segment of the new process on another machine.” However, the specific limitations in these claims are clearly not inherent in this statement at col. 2, lines 62-65, of Sun. For example, the process state sent to migrate a process would not necessarily have to include a heap as recited in claim 3. Claims 4-7 refer to particular types of lease information that is clearly not inherent in Sun. There is absolutely no mention at all in Sun of any type of persistent heap and sending process state from a persistent store as recited in claims 10-12. These limitation a clearly not inherent in Sun. In regard to claim 15, it is certainly not inherent in Sun that process state be sent and received as part of an atomic transaction that is committed or rolled-back. Most communications between computers are not performed transactionally and it would certainly not be required in Sun. Applicants remind the Examiner that the he must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). “The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *Continental Can*, 948 F.2d at 1268, 20 USPQ2d at 1749. None of the limitations of claims 3-12, 15, 19 and 20 are necessarily present in or suggested by Sun.

In regard to claim 18, Sun clearly does not teach or suggest a persistent store for storing and sending process state that is on a server external to the first device and the second device. The portions of Sun cited by the Examiner make no mention at all of such a persistent store on a server external to the devices on which the process is being migrated.

The Office Action rejected claims 13, 14, 16, 17, 24, 37-40, 45, 54 and 55 under 35 U.S.C. § 103(a) as being unpatentable over Sun in view of Cejtin et al. (U.S. Patent 5,745,703) (hereinafter “Cejtin”). Applicants respectfully traverse this rejection in light of the following remarks.

Claims 13, 14, 16, 17, 24, 37-40, 45, 54 and 55 are patentable for at least the reasons given above in regard to claim 1.

Furthermore, in regard to claim 13, the concept of a first virtual heap for storing pages flushed from the first in-memory heap is nowhere to be found in the portions of Cejtin cited by the Examiner nor any other part of Cejtin. Nor does Cejtin teach or suggest storing one or more pages from the first in-memory heap to the first virtual heap in the persistent store and sending a copy of the first virtual heap from the persistent store to the second device. Note that the virtual machines shown in Fig. 19 of Cejtin having nothing to do with a virtual heap as recited in claim 13. Just because a process runs in a virtual machine does not teach a virtual heap as recited in claim 13. Similar arguments apply for claims 37 and 54.

Furthermore, there is no suggestion that the process migration technique of Sun would be applicable to processes running in Java Virtual Machines as in Cejtin. Sun pertains to migrating processes between different environments, whereas Cejtin employs message passing between JVMs that share an address space. The techniques of the two references are unrelated and there does not appear to be any reason to apply the teachings of one to the other. In fact, Sun specifically teaches away from using a Java Virtual Machine. At col. 2, lines 57-59, when referring to Java running on a virtual machine, Sun states that “these languages are less powerful, slow, and require rewrites of existing software.” References that teach away cannot serve to create a prima facie case of obviousness. *In re Gurley*, 27 F.3d 551, 553, 31 USPQ2d 1131, 1132 (Fed. Cir. 1994). It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 218 USPQ 769, 779 (Fed. Cir. 1983). The combination of

Sun and Cejtin is improper since Sun specifically teaches away from using a Java Virtual Machine.

**Information Disclosure Statements:**

In regard to the Examiner's request for Applicants to point out which of the prior art references are pertinent or relevant, Applicants note that the references were compiled from numerous sources pertaining to the general field of the invention. The references are believed to each be relevant to at least some aspect of Applicants' claims and were cited to ensure compliance with 37 CFR 1.56. However, Applicants have no particular knowledge of the relative relevancy of the cited documents.

## CONCLUSION

Applicants submit the application is in condition for allowance, and notice to that effect is respectfully requested.

If any extension of time (under 37 C.F.R. § 1.136) is necessary to prevent the above referenced application from becoming abandoned, Applicants hereby petition for such extension. If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5181-46400/RCK.

Also enclosed herewith are the following items:

- ☒ Return Receipt Postcard
- ☐ Petition for Extension of Time
- ☐ Notice of Change of Address
- ☐ Fee Authorization Form authorizing a deposit account debit in the amount of \$  
for fees (        ).
- ☐ Other:

Respectfully submitted,



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